- BEDSIDE MEDICINE FOR BEDSIDE DOCTORS -

An open forum for brief discussions of the workaday problems of the bedside doctor. Suggestions for subjects and discussants invited. Useful extracts from letters will be published.

THE PRACTICABILITY OF RADIOLOGICAL VISIBILITY OF THE GALL-BLADDER: ITS AVAILABILITY, INDICATIONS AND VALUES TO THE FAMILY DOCTOR

The Editor—That improved radiologic technique gives evidence of value in the diagnosis of gall-bladder trouble seems amply demonstrated. Many careful radiologists are seriously engaged in efforts to still further improve and simplify current procedures, and the growing literature seems to imply progress.

The tremendous value to thousands of patients of thus adding to our diagnostic procedures positive evidence where conclusions formerly were perforce arrived at by indirection is, of course, obvious. But this is not enough: the technique must be simplified until it is far more widely available than now, and the costs of the effort must be reduced before this valuable contribution can be made available to or paid for by the average patient.

That the vast majority of physicians have so far taken little interest in this live subject, is indicated by the fact that, of the many who were invited to discuss the subject here, all except those well known for their radiologic experiences declined to take part in the discussion, usually giving as reasons that they knew nothing about it or had had no experience.

Well-equipped radiological laboratories and competent radiologists are well distributed in California, and with the clear résumé of our knowledge of the value of radiologic methods here set forth, it is likely that the interest of physicians may become more general.

The invitation for suggestions for subjects for *Bedside Medicine for the Bedside Doctor* is a standing one.

W. W. Boardman * (350 Post Street, San Francisco) — The realization that many of the gastro-intestinal upsets seen in routine clinical work and so easily dismissed as nervous indigestion, flatulent dyspepsia, etc., are in fact the reflex manifestations of chronic gall-bladder disease, has led to efforts to develop special means of arriving at an early and accurate diagnosis of such disease. Among the various measures proposed, we may mention, in passing, the careful analysis of the inaugural symptoms and signs, the Lyons' method of studying the duodenal content, and the various liver function tests, but we wish at this time to consider only the radiographic procedures—their practicability, availability, indications, and value.

A complete radiographic study of the gall-bladder should include (1) several films of the gall-bladder region, usually after thorough emptying of the gastro-intestinal tract, followed by (2) a study of the gall-bladder region we may discover shadows of tetraiodophenolphthalein, either by mouth or intravenously, and (3) supplemented by a careful barium-meal study of the entire gastro-intestinal tract.

From such an examination certain positive and negative evidence may be derived. In the first films of the gall-bladder region, we may discover shadows characteristic or suggestive of gall-stones, or we may find a more or less definite shadow of the gall-bladder. The significance of this latter finding is open to some question, although it has been thought by some to indicate a pathological gall-bladder.

Our interest at present is especially fixed on the tetraiodophenolphthalein test. This consists of the oral or intravenous administration of tetraiodophenolphthalein which is excreted in the bile, is normally concentrated in the gall-bladder, and, owing to the iodine ion which it contains, the density of the gall-bladder contents becomes sufficient to cast beautiful shadows in the radiograph. Films are taken at certain stated intervals after the administration of the dye, and then compared. From these films we are able to study the filling, concentrating function, and emptying of the gall-bladder, as well as the size, shape, position, outline and density of the shadows, and its relationship to other adjacent shadows. Following such a test we may find three results: (1) A perfectly normal reaction, which indicates a normally functioning biliary system; (2) an absolute failure to visualize the gall-bladder, which indicates marked disturbance in function, in that the dye failed to enter the gall-bladder in appreciable quantities; or (3) an incomplete visualization, which indicates some disturbance in biliary tract function, in that the gall-bladder did not normally fill or normally concentrate or normally empty.

In interpreting these findings it must be kept in mind that the test is primarily one of function. It is therefore conceivable that a mildly diseased biliary tract may show normal function and that a normal tract, because of various reflex disturbances, may show abnormal function. However, the evidence so far at hand seems to indicate that a normal reaction excludes gross pathological changes and that a partial or complete failure of visualization indicates mild or severe pathological changes. These changes will usually be found in the cystic duct or gall-bladder, and may consist of obstructions of the duct, thickening of the gall-bladder wall, loss of epithelial lining, or a lumen filled with stones. It must be emphasized that an incomplete visualization after the oral administration may result from faulty intestinal absorption rather than from disturbed biliary tract function. Little importance can therefore be attached to such a test, unless it be repeated by the intravenous method.

The oral method of administration may be used routinely for ambulatory patients, although it is occasionally followed by mild reactions, consisting of nausea and vomiting. The intravenous method requires careful preparation and technique, and should preferably be a hospital procedure. It must be kept in mind that the intravenous administration of any of these foreign dyes is always attended with a certain danger, and, although as yet no reports of serious consequences after the use of this

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dye have appeared, it is not a procedure to be used indiscriminately in office practice. The reactions so far encountered have been few in number, mild, and of short duration, but nevertheless I would advise hospitalization until further experience has demonstrated its safety as an office procedure.

Finally, the routine barium-meal study will frequently show evidence of pressure or adhesion, deformity of the antrum or cap, presumably the result of gall-bladder disease. Another finding of some value is a high, fixed hepatic flexure. The functional disturbances in motility are of slight diagnostic importance, but the positive demonstration of other lesions of the stomach or bowel is of great value.

From this review it is evident that we have at our disposal means of studying the size, shape, position and outline of the gall-bladder, its filling, its concentrating function and its emptying, as well as any variations in the density of its shadow. We can also, in the occasional case, definitely demonstrate gall-stone shadows, and in others strongly suspicion their presence, and we can finally demonstrate the presence of adhesions or pressure from the gall-bladder upon the antrum duodenum and hepatic flexure of the colon.

The most careful technique is necessary in obtaining this evidence, and skill, experience and conservatism are absolutely essential to a proper interpretation of the findings.

The positive and negative evidence so obtained is of the greatest diagnostic value, if carefully correlated with the evidence obtained from the history, physical examination and other special tests, so as to build up a composite picture of gall-bladder disease. Without such careful correlation, serious diagnostic and therapeutic errors may be made.

Walter C. Alvarez * (Mayo Clinic, Rochester, Minnesota, formerly of San Francisco) — I have been using the Graham technic in my office for some time, but have not yet made up my mind as to its value. There is no question that it is helpful to have the gall-bladder visualized for us; and occasionally stones become apparent—stones which otherwise would not have been seen. It is helpful also to know that a particular gall-bladder does not fill with the dye, but, as is the case with all negative evidence, we cannot rely entirely upon it as a sign of disease.

I recently had a talk with Dr. Carman of the Mayo Clinic, who has probably had the largest experience of anyone with this technic. After using it on several thousand patients he has come to the conclusion that it is of distinct value in the diagnosis of gall-bladder disease. He admits that the failure of the organ to fill does not always mean an abnormal-looking gall-bladder at operation; and he has seen many diseased gall-bladders which filled well; but on the whole he thinks that this procedure will help us a good deal.

He has found that there is no need for giving keratin or salol-coated capsules, and I have confirmed this finding. The important point made by Carman is that the bromin salt is by far the best to give by mouth, and the iodin salt is the best to give intravenously. At the Mayo Clinic they always give the bromin salt first by mouth. Some patients are nauseated; quite a few have diarrhea; and occasionally one is quite sick; but there is never anything worth worrying about. The dose is graduated according to the weight of the individual. In my office we always give the patient half a grain of codein, which he can take if he develops cramps or diarrhea.

We have found that, with an office practice, it is best to give the salt about 8 o'clock in the evening. The patient then returns at 10 the next morning for a series of plates. Some physicians take plates again after eighteen and twenty-four hours, but we have not found this practice sufficiently worth while. The patient must not take breakfast in the morning, because that causes the gall-bladder to empty. If the gall-bladder shows up well, nothing more need be done; but if it should not fill, then we may give the iodin salt intravenously in order to make still surer of the findings. Actually, I have never done that because, as Dr. Boardman says, the reactions are sometimes severe, and there are a number of cases on record in which, in spite of the utmost care, the vein in the arm became thrombosed and badly inflamed. In some patients it even had to be cut out. As one such harrowing experience would be quite sufficient to cure one of using this technic, I have never had the courage to begin, and instead have waited for those with large hospital services to experiment and to get, perhaps, a better drug and a better technic. Unless they do succeed in that the procedure will always have but a limited application.

Whatever comes of it the diagnosis of gall-bladder disease will probably always depend mainly as it does now—on the careful interpretation of a well-taken history.

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the use of the halogen phenolphthaleins in visualizing gall-bladders, we have come to the conclusion that it is of distinct value, but there are many points that must be borne in mind in making an interpretation of the findings. This is especially true now that the dye is usually given by mouth. We have tried nearly all the different methods—coated and uncoated capsules and pills—and have had the most constant success with a method originated by Menees, somewhat modified. Our capsules are the ordinary gelatine capsule hardened for two hours over formalin, that is, in the formalin vapor. A thick paste of tetraiodophenolphthalein sodium salt is then made with olive oil. It is essential that the olive oil be neutral or alkaline; some of the olive oils are distinctly acid, and this ruins the solubility of the salt. In order to protect against this we add between one and two grains of sodium bicarbonate to each capsule. The capsule contains approximately six grains of the dye, and we use from ten to sixteen or eighteen of these capsules, depending on the weight of the patient. The patient is instructed to take them, beginning at 8 p. m., two at a time every fifteen minutes, and to wash them down with half a glass of water containing a little soda bicarbonate. They appear for their first x-ray at 9 a. m. in the morning without breakfast. They then eat breakfast of a cereal, toast, and coffee or tea, as they wish, and two hours after breakfast another film is taken. A third examination is made late in the afternoon, and again the following morning, providing the gall-bladder was visualized at the other examinations.

The first film is a 14 x 17, and must cover the entire abdomen so that it can be determined whether the dye has been absorbed or not. If it has not been absorbed it will be found scattered along the colon. Unopened capsules show up very distinctly. If it is evident that there has been little or no absorption, the examination is repeated in a day or two, the patient being instructed to take a good dose of compound licorice powder twenty-four hours before taking the capsules. We have had gall-stones become visible after this procedure, when no results were obtained at the first try. If the gall-bladder is not visualized at the second attempt, we assume that it is abnormal; but we always state that, in order to make a positive statement, the examination should be repeated after an intravenous injection of the dye. This third attempt should be postponed for a week to prevent the possibility of the toxic effect. One cannot use the Graham criteria for abnormal gall-bladders when the dye is given by mouth, as there are too many other factors to be considered. However, if one remembers that non-absorption of the dye results in nonvisualization of the gall-bladder, and that the visualization, when it does fill, is not as distinct as after intravenous injection, a fairly accurate interpretation can be made in many cases.

I wish to emphasize at this point, however, the absolute necessity of intravenous injection where the examination was negative when the dye was given by mouth. If one wishes to base his diagnosis entirely on the roentgen findings, this method is extremely valuable and will become more so as time goes on and we learn what the variations in shadows mean. A thorough and searching history will frequently be of as much value as the use of the dye by mouth, especially if the gall-bladder does not fill. There is nothing that will shake one's ego so much as to make a positive report as to the condition of a gall-bladder, to find it entirely negative at operation.

Howard E. Ruggles * (Fitzhugh Building, San Francisco)—Cholecystography has now been tried for a sufficient length of time to permit of a fair estimate of its value.

In our hands it has been of the greatest value in demonstrating stones. With good technic practically all gall-stones can be visualized. This alone is sufficient to establish the method on a permanent basis. In addition, distortion of the gall-bladder by adhesions is occasionally shown. The evidence of abnormal function is less definite, but perhaps increased experience will improve our results in this direction.

The iodide salt is preferable and should be administered in plain gelatin capsules containing 7½ grains each. Three such capsules may be taken every half hour after an ordinary dinner until the full dose has been ingested. The dosage is 5 grains of the dye to ten pounds of body weight.

Films are made at 15, 18, and 20 hours after taking the capsules. No food is allowed until after the eighteen-hour film, when a meal containing considerable fat is ordered.

The fifteen-hour examination usually shows a large and rather faint shadow, which is smaller and more dense at eighteen hours and very small or absent at twenty hours. Grossly pathological gall-bladders either fail to appear or are represented by faint outlines of approximately constant size and density. Stones are quite readily seen as mottling within such a gall-bladder or as single or multiple "holes" in the iodine shadow. If the gall-bladder is not seen the examination should be repeated, and if the second attempt is likewise negative, gall-bladder disease, a blocked cystic duct, or gross liver pathology should be suspected.

Intravenous injection is troublesome and unnecessary in most cases.

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Judging by the expressions of opinion that I have heard from patients about the group method of practice, its greatest defect lies in the feeling of the patient that he has missed a personal interest in himself, and that he suspects that he has not quite understood the results of his examination and has but vague ideas of what it is intended that he should do, largely because no single individual of the group has spent sufficient time considering him and talking to him as a whole organism needing new adjustments. As I myself have subsequently seen patients who have gone to a group for diagnosis, these misgivings of the patient often seem justified.—Henry A. Christian (Journal A. M. A.).